AVANTech
INCORPORATED
avantechinc.com

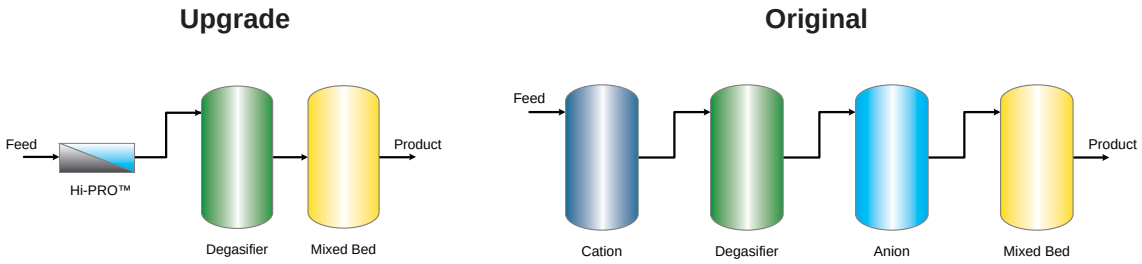
Product
Application
Profile

Upgrade Ion Exchange Based System with Reverse Osmosis

Client: Chemical Manufacturer

Reverse Osmosis provides cost and performance advantages compared to Ion Exchange.

Reverse Osmosis Retrofit of Ion Exchange



Background:

Providing high purity water usually requires an ion exchange (IX) system. For feed water with relatively low levels of dissolved solids, ion change is perhaps all that is necessary. At higher solids levels, however, or if particulate or organics removal is important, using reverse osmosis (RO) membranes ahead of IX beds can provide greater overall efficiency. The technology selection is based on capital, operations and maintenance (O&M) costs, and the environmental impact of each technology. RO will add to the capital costs, but will reduce the O&M costs with regard to regeneration, resin replacement, and chemical discharges. Above a certain solids level, the total cost of a combined RO/IX system is less than the cost of ion exchange alone. As a rule of thumb, the current breakpoint is about 100 ppm TDS, a level that is at or below most fresh water sources.

Solution:

AVANTech provides treatment solutions that can be easily and cost-effectively integrated into customer facilities. RO systems, such as Hi-PRO™, act as a demineralizer similar to the two bed cation/anion system shown in the original system. This compact, skid mounted system was provided retrofitted into the facility in an area adjacent to the original cation/anion system. Pipe connections from the facility's pretreatment system and to the degasifier were easily completed. The control system consists of a process controller, a local control panel, and a Supervisory Control Station networked together. The RO can be operated from either station. Graphical displays communicate the status of the RO. Taking process control a step further, the system alerts the operator of conditions that could cause equipment problems and/or out-of-specification product output. Alerted to the changing conditions, the operator has ample time to adjust the equipment to maintain peak operating efficiency.

The combined effects of escalating chemical prices (sodium hydroxide and acid) and the offsetting lower energy requirements of low pressure RO membranes have created a dramatic shift in the economics of high purity water treatment technology. Thus, compared with straight IX systems, the combined RO/IX operation can provide economic advantages that merit retrofits. In existing IX systems, a retrofit of RO ahead of the demineralizers can be justifiable at a feed water TDS as low as 100 ppm. Further, low pressure membranes allow the user to optimize the operating parameters, taking into account such variables as feed water temperature, TDS, energy, raw materials, and membrane expense to minimize capital and O&M.

▪ 803.407.7171 ▪ 2050 American Italian Way, Columbia, South Carolina 29209
▪ 865.539.9000 ▪ 2680 Westcott Boulevard, Knoxville, Tennessee 37931
▪ info@avantechinc.com ▪ **www.avantechinc.com**

AVANTech INCORPORATED